CALTRANS MAINTENANCE PROGRAM

2001 Survey of Licensed California Drivers Regarding Highway Maintenance Activities

Briefing Report 1: Evaluations and Satisfaction with Existing Services

February 2002

Prepared for

Department of Transportation
State of California
Sacramento, California

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Introduction

This is the first of three reports describing results and implications of the 2001 Cal Trans Maintenance Program Survey of Licensed California Drivers Regarding Highway Maintenance Activities. In addition to the three substantive reports, there is a "Methodological Addendum" which describes research protocols, sample variation from the 1998 survey, and examines the impact of September 11, which intersected data collection for this study. This report, Report No.1, focuses on "Evaluation and Satisfaction with Existing Services."

Overall, California drivers are well satisfied with the maintenance activities of the California Department of Transportation. We discerned no area of CalTrans effort that revealed dissatisfaction with service, and the most common response was one of moderately high satisfaction. This was true for all seven areas that we measured:

1. Maintenance Response
2. Safety
3. Pavement Conditions
4. Traffic Flow
5. Travel Amenities
6. Visual Appeal
7. Overall Evaluation

In addition, it was true for all eight regions of the state, as well, though moderate variations are measured by region. In general, licensed California drivers in rural areas are slightly more satisfied with CalTrans maintenance activities than are urban drivers.

We also examined satisfaction levels by major traveled freeways, including Interstate Freeways 5, 10, 15, 99, 101, and 405. Here, again, the overall response of California drivers was very favorable. However, we do identify a few striking---though still favorable---variations, some clearly related to geographic location. For example, the lowest evaluation occurred for "Ice and Snow Removal" on Interstate 10, which also received the highest evaluation for "Debris Removal."

Perhaps most importantly, we discern relatively little volatility in responses. There is a widespread consensus among California drivers, with little arch disagreement, and that consensus is overwhelmingly favorable. One area in which there is greater volatility in responses is "Pothole Repair," while "Trip Quality" and "Overall Rating" register some of the least volatility, and highest evaluations.

Methodology

During the weeks of August 12, 2001, and November 1, 2001, a survey of California drivers was designed and administered by the Applied Research Center at California State University, Bakersfield. The purpose of this survey was to assess drivers' attitudes toward the services provided by the California Department of Transportation (CalTrans).

The survey gathered data from a random sample of registered drivers in California. A team of trained student interviewers administered the survey instrument during daytime and evening hours. 3,300 interviews were conducted with registered drivers. The margin of error is approximately +/- 4.0 percent at the 95 percent confidence level.

All interviewing was conducted from the Applied Research Center at California State University, Bakersfield. A project director was present at all times to supervise the administration of the sample, data entry, monitor for quality control, and handle any problems. Shifts of interviewers were used during the daytime (10am to 5pm) and evening hours (6 to 9pm). Telephone numbers were selected at random from the cities and towns in the target area and purged of non-working and business numbers. All telephone numbers in the sample were then called up to four times, using a rotating schedule of callbacks to ensure that a telephone number had been tried on different weekdays.

Upon completion of calls, the survey responses were entered into a computer database. Using statistical software (SPSS for Windows Version 10.0), the data file was analyzed. Complete protection and confidentiality of the survey database was assured during all phases of data analysis. Access to the database was limited to the project directors and their assistants.

Demographic Characteristics of Respondents' Sample

Tables 1 through 5 summarize demographic characteristics of the survey respondents. As Table 1 shows, the **gender of the respondents** was approximately an equal mix of female (47.4%) and male (45.4%).

Table 1: Gender

Gender	**Percent of Respondents**
Male	45.4
Female	47.4

The **age** of the respondents is condensed in Table 2. Less than 10% (8.7%) were between the ages of 18 and 25 years. Just over 10% (10.6%) were between the ages of 26 and 35 years, while 14.5% were between the ages of 36 and 45 years, and 27.2% were between the ages of 46 and 60 years. Over one-third (36%) were 61 years and older.

Table 2: Age

Age Group	Percent of Respondents
18-25 years	8.7
26-35 years	10.6
36-45 years	14.5
46-60 years	27.2
61 and over years	36.0

The **employment status** of the respondents is presented in Table 3. Over one-third (39.2%) reported working full-time while 11.7% reported working part-time and 4.5% reported being unemployed. One-third (33%) of the respondents were retired, 6.7% were homemakers, and 1.5% were disabled.

Table 3: Employment Status

Employment Status	Percent of Respondents
Full-time	39.2
Part-time	11.7
Unemployed	4.5
Homemaker	6.7
Retired	33.0
Disabled	1.5

Table 4 summarizes the respondents' reported race or ethnicity. Nearly three-quarters were white (73.2%), 8.2% were Latino, 1.8% were African American, 3.5% were Asian, and 1.5% were Native American. It should be noted that over 10% of the respondents did not report their race in one of these categories (3.1% reported "other" and 8.7% did not report a race/ethnicity).

Table 4: Race or Ethnicity

Race or Ethnicity	Percent of Respondents
Anglo/White	73.2
Latino	8.2
African American	1.8
Asian	3.5
Native American	1.5
Other	3.1

Table 5 categorizes the **income** of those respondents who chose to report this information; it is worthy of note that nearly one-third (30.6%) of the respondents chose not to report their income. Six percent reported earning less than $20,000. Combining categories, one-third (33.3%) reported income of less than $50,000. Slightly more than a quarter (27.6%) reported income between $50,000 and $100,000 and 8.5% reported income of over $100,000.

Table 5: Income

Income Categories	Percent of Respondents
<$20,000	6.0
$20-34,999	11.6
$35-49,999	15.7
$50-64,999	11.9
$65-79,999	8.8
$80-99,999	6.9
>$100,000	8.5

Demographic and Driving Characteristics of Respondents by Region

Tables 6 through 9 present demographic and driving characteristics of the survey respondents by geographic region. The eight regions represented were "Eastern," "North Valley", "Sacramento", "San Joaquin Valley", "Bay Area", "Coast", "Los Angeles Basin" and "San Diego". As Table 6 shows, six of the eight regions had between 409 and 421 respondents. One region, the "Bay Area" had fewer respondents: 362. Another region, the "Sacramento" region had a greater number of respondents: 430.

Table 6: Number of CalTrans 2001 Maintenance Survey Respondents by Geographic Region

Region	Respondents
Eastern	409
North Valley	415
Sacramento	430
San Joaquin Valley	411
Bay Area	362
Coast	414
LA Basin	415
San Diego	421

Because the California Department of Transportation places a high value on detecting regional variations in performance, respondents' demographic information was first examined by the eight geographic regions of California. Table 7 summarizes key demographic characteristics of the respondents by geographic region. Comparing Table 7 to Tables 1 through 5 revealed no remarkable **gender differences** by region. However, the **age group** data suggests that the "18-29 years" age group is least in the Eastern California and North Valley regions, while the "60 and over years" age group is larger in the same regions. An examination of the **employment status** data reveals comparatively fewer full-time working respondents in the Eastern California region while the Bay Area respondents have proportionately more full-time workers. The Eastern California and North Valley respondents are over-representative of retired persons. The **ethnicity data** shows that the Eastern California and North Valley regions have comparatively more white respondents and fewer Latino respondents. Conversely, the San Joaquin Valley has the most Latino respondents. The Los Angeles Basin is the most ethnically diverse region with substantial populations of Latino, African American, and Asian respondents, while the Bay Area has the highest number of Asian respondents. Finally, considering **income** data, the Eastern California, North Valley, and Coast regions have comparatively more low-income households (<$20,000), while the Bay Area and Los Angeles Basin have more high-income households (>$100,000).

Table 7: Demographic Characteristics in Percent of CalTrans 2001 Maintenance Survey Respondents by Geographic Region

Characteristics	Eastern CA	North Valley	Sacramento	San Joaquin Valley
Gender:				
Male	50.8	49.0	45.5	47.8
Female	49.2	51.0	54.5	52.2
Age Group:				
18-29 Years	5.0	7.6	9.3	12.6
30-39 Years	5.3	6.8	14.1	15.7
40-49 Years	15.6	16.7	18.8	18.3
50-59 Years	24.0	21.3	19.6	15.7
60+ Years	50.1	47.6	38.2	37.8
Type of Driver's License:				
Class A	5.0	6.6	4.5	5.7
Class B	1.7	3.4	1.2	2.0
Class C	93.3	90.0	94.1	92.0
Employment Status:				
Full-Time	31.0	34.9	43.8	40.2
Part-Time	11.2	10.1	11.5	13.1
Unemployed	1.8	3.0	2.6	5.1
Homemaker	4.8	6.2	7.4	7.3
Retired	49.5	43.1	33.5	32.3
Disabled	1.8	2.7	1.2	2.0
Ethnicity:				
Anglo/White	90.7	92.6	82.0	74.7
Latino	2.4	1.6	6.4	15.4
African American	0.8	0.0	2.6	1.3
Asian	0.3	0.8	4.1	3.6
Native American	2.7	2.9	1.8	2.1
Other	3.2	2.1	3.1	2.9
Income:				
< $20,000	15.7	12.5	5.9	7.7
$20-34,999	19.6	27.9	16.0	19.5
$35-49,999	23.6	25.3	21.8	27.2
$50-64,999	18.2	15.5	18.6	17.8
$65-79,999	10.4	7.7	16.9	11.1
$80-99,999	5.0	7.7	9.4	10.8
> $100,000	7.5	3.4	11.4	5.9

Table 7 (cont.)

Characteristics	Bay Area	Coast	LA Basin	San Diego
Gender:				
Male	50.0	47.6	53.9	47.0
Female	50.0	52.4	46.1	53.0
Age Group:				
18-29 Years	13.4	11.3	14.6	16.0
30-39 Years	14.8	15.4	18.2	14.2
40-49 Years	21.4	15.4	17.7	18.3
50-59 Years	22.3	18.7	21.1	18.3
60+ Years	28.2	39.1	28.4	33.2
Type of Driver's License:				
Class A	3.3	3.7	2.7	2.4
Class B	0.3	2.5	0.2	0.5
Class C	96.1	93.9	96.3	96.6
Employment Status:				
Full-Time	49.0	39.4	44.8	43.1
Part-Time	11.3	13.5	13.5	12.5
Unemployed	6.5	4.1	8.1	6.3
Homemaker	8.2	7.9	7.1	7.0
Retired	24.1	33.6	25.4	30.3
Disabled	0.8	1.5	1.0	0.8
Ethnicity:				
Anglo/White	73.7	82.3	65.3	78.7
Latino	7.9	11.4	17.1	9.9
African American	2.4	0.8	5.6	2.1
Asian	10.9	1.8	6.7	3.9
Native American	0.9	1.3	1.1	0.5
Other	4.2	2.3	4.3	4.9
Income:				
< $20,000	0.8	10.2	8.2	7.4
$20-34,999	7.1	18.1	10.5	14.3
$35-49,999	16.9	25.3	20.7	19.9
$50-64,999	16.9	13.7	18.0	18.0
$65-79,999	12.9	12.3	13.3	16.9
$80-99,999	14.5	9.2	13.3	9.9
> $100,000	31.0	11.3	16.0	13.6

Driving Characteristics

Table 8 presents various **driving characteristics** of respondents by geographic region. For most regions, the respondents were equally mixed between those who are AAA members and those who are not members. However, respondents in the Bay Area and Los Angeles Basin report AAA membership in higher numbers resulting in approximately two-thirds membership; 66.1% and 64.0% respectively. When asked where they drive most often, respondents in the Eastern California region indicated rural areas while respondents in the Bay Area, Los Angeles Basin and San Diego regions indicated urban areas. Responses in the North Valley, Sacramento, San Joaquin Valley, and Coast regions were variously split between rural and urban driving.

Table 8: Driving Characteristics in Percent of CalTrans 2001 Maintenance Survey Respondents by Geographic Region

Characteristics	Eastern CA	North Valley	Sacramento	San Joaquin Valley
AAA Member				
Yes	56.3	52.6	56.0	46.4
No	43.8	47.4	44.0	53.6
Where Drive Most:				
Urban	12.7	30.2	52.4	44.6
Rural	69.7	42.3	20.3	29.7
Both Equally	17.6	27.0	26.6	25.5
Miles Driven Per Month:				
0-400 Miles	37.3	36.7	33.7	35.4
400-800 Miles	20.9	22.6	22.3	21.5
800-1200 Miles	20.4	20.0	23.0	19.7
1200-1600 Miles	7.4	6.2	6.6	7.7
1600+ Miles	14.0	14.6	14.4	15.7
Type of Vehicle				
Car	47.4	54.8	61.6	62.0
Van	7.5	10.3	9.7	10.3
SUV	16.0	8.1	10.6	7.1
Truck: Light	27.4	23.0	17.7	19.6
Truck: Heavy	1.2	2.9	0.2	0.5
Other	0.5	1.0	0.2	0.5
Work in Law Enforcement:				
Yes	4.1	0.7	1.5	4.4
No	95.9	99.3	98.5	95.6

Table 8 (cont.)

Characteristics	Bay Area	Coast	LA Basin	San Diego
AAA Member				
Yes	66.1	56.4	64.0	55.8
No	33.9	43.6	36.0	44.2
Where Drive Most:				
Urban	75.8	39.9	74.1	71.2
Rural	9.7	35.7	11.8	12.7
Both Equally	14.4	23.9	13.1	15.3
Miles Driven Per Month:				
0-400 Miles	40.0	40.9	35.7	33.3
400-800 Miles	23.9	21.9	27.1	22.7
800-1200 Miles	18.2	22.1	18.2	22.7
1200-1600 Miles	5.7	6.0	6.2	7.5
1600+ Miles	12.2	9.1	12.9	13.7
Type of Vehicle				
Car	71.9	65.3	65.0	62.9
Van	8.9	7.8	7.1	9.8
SUV	10.6	9.0	13.0	10.3
Truck: Light	8.1	16.9	14.0	16.0
Truck: Heavy	0.3	0.5	0.5	0.0
Other	0.3	0.5	0.5	1.0
Work in Law Enforcement:				
Yes	1.7	3.0	1.2	0.7
No	98.3	97.0	98.8	99.3

When examining the data for "**miles driven per month**," no outstanding differences by region were noted. For all regions, approximately 40% of respondents reported driving "0-400 miles" per month while 20% more reported driving "400-800 miles" and another 20% reported driving "800-1200 miles." As Table 8 shows, one-half to two-thirds of the respondents in all regions reported driving a car. Sports utility vehicle (SUV) and light truck use was high in the Eastern California region. Finally, when respondents were asked if they **worked in law enforcement**, across all regions 96-99% indicated that they did not.

Traffic Information

Table 9 shows respondents' preferred methods of **receiving information** on traffic conditions by geographic region. Across the eight regions, one-half to three-quarters of respondents preferred receiving traffic information over the radio; respondents in the Bay Area, Los Angeles Basin, and San Diego regions are particularly inclined toward this method of information acquisition. The second most frequently preferred method, as indicated by approximately 15% or

respondents, was television. However, North Valley respondents indicated a notably greater preference (21.3%). As Table 9 illustrates, the third most frequently preferred method of obtaining traffic information was the CalTrans "800 number." Here there is significant variability by region. Five to 10% of respondents in six of the regions indicated that they preferred this method while nearly 25% of respondents in the Eastern California, and North Valley regions did so; 21.8% and 25.1% respectively.

Table 9: Preferred Methods of Receiving Information on Traffic Conditions in Percent of CalTrans 2001 Maintenance Survey Respondents by Geographic Region

Method	Eastern CA	North Valley	Sacramento	San Joaquin Valley
Radio	41.6	36.0	55.9	53.2
Website	4.6	2.5	2.2	3.1
Television	15.0	21.3	17.0	17.3
800 Number	21.8	25.1	8.4	10.2
Road Signs on Hwy	7.9	7.9	12.1	10.4
CHP	3.3	3.3	1.0	2.8
Personal Digital Device	0.5	0.0	0.2	0.3
Friends/Family	2.0	1.5	0.7	1.0
Other	3.3	3.0	2.5	1.8

Method	Bay Area	Coast	LA Basin	San Diego
Radio	73.5	51.0	67.7	64.2
Website	3.1	2.3	5.4	4.3
Television	9.1	15.4	11.8	13.5
800 Number	4.8	10.3	2.3	4.8
Road Signs on Hwy	6.8	10.5	10.0	7.8
CHP	0.9	3.3	1.5	0.5
Personal Digital Device	0.3	0.5	0.0	0.8
Friends/Family	0.6	0.5	0.3	0.8
Other	0.9	6.2	1.0	3.5

Maintenance Categories

California drivers who responded to the survey were asked to rate their satisfaction within each of the seven maintenance categories of survey questions. Each respondent rated satisfaction on a scale from one to ten with one indicating extreme dissatisfaction and ten indicating extreme satisfaction. The seven maintenance categories and each of the associated subcategories are outlined below:

1. Maintenance response
   - removal and cleanup of hazardous spills and debris from accidents
   - detours around accidents or closures

- response to natural disasters
- signs about temporary hazards

2. Safety
   - ice and snow removal
   - chain controls
   - debris removal
   - safety barriers
   - maintenance of shoulders and turnouts
   - sign visibility

3. Pavement conditions
   - smooth road surfaces
   - surface traction
   - visibility of pavement markings
   - removal of old pavement markings
   - pothole repair
   - pavement resurfacing
   - smooth approaches to bridges

4. Traffic flow
   - information provided on traffic conditions and delays
   - timing and scheduling of maintenance activities
   - the amount of time added to a trip due to maintenance delays

5. Travel amenities
   - rest room maintenance at rest areas
   - rest area grounds
   - safety and lighting at rest areas

6. Visual appeal
   - landscape maintenance
   - weed control
   - litter removal
   - graffiti removal

7. Overall
   - trip quality
   - overall satisfaction

The tables and figures that follow indicate levels of satisfaction for each maintenance subcategory by the following three analyses: (1) respondent's region of the state, (2) respondent's most frequently traveled freeway, and (3) respondent's most frequently traveled setting: urban or rural. First, the mean level of satisfaction for each maintenance category was

calculated by its subcategories for region. Included is the standard deviation (S.D.), which indicates the amount of variation that exists around the mean value. Larger standard deviations indicate greater response variation for the question. Conversely, lower values for the standard deviation indicate less variation for the question.

Second, the mean level of satisfaction within each maintenance subcategory was calculated for the most frequently driven freeways. While the sample covers the entire state of California, there were not enough cases to process statistics and comparisons for all of the freeways. The freeways included in this study are Interstate 5, 10, 15, 99, 101, and 405.

Third, the mean level of satisfaction for each maintenance subcategory was calculated for respondents traveling urban versus rural settings. While the regions analysis indicates the geographic region of a respondent, it does not indicate whether the respondent travels mostly on urban or rural roads. The urban versus rural analysis allows a richer distinction to be made in the evaluation of CalTrans services.

Satisfaction with Maintenance Response

Table 10 summarizes satisfaction with maintenance response activities by region. As Table 10 shows, for each of the eight regions, respondents were consistently quite satisfied with maintenance responses for **accident cleanup** (means ranged from 8.7 to 85.), **disaster response** (means ranged from 7.9 to 8.4), and **hazard signs** (means ranged from 7.8 to 8.5). Respondents in the Bay Area and Los Angeles Basin rated **detours** lower than those in the other six regions; the mean level of satisfaction with this maintenance subcategory was 7.0 for both the Bay Area and the Los Angeles.

Table 10: Satisfaction with Maintenance Response by Region

Question	Eastern CA		North Valley		Sacramento		San Joaquin Valley	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1. Accident Cleanup	8.4	1.7	8.5	1.7	8.1	1.8	8.2	1.8
2. Detours	8.0	1.8	8.3	1.5	7.5	2.0	7.7	1.9
3. Disaster Response	8.4	1.7	8.4	1.5	8.4	1.5	8.4	1.7
4. Hazard Signs	8.3	1.7	8.5	1.6	8.2	1.5	8.2	1.6

Question	Bay Area		Coast		LA Basin		San Diego	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1. Accident Cleanup	7.9	1.7	8.4	1.7	7.8	2.0	8.0	1.8
2. Detours	7.0	2.1	7.9	1.9	7.0	2.2	7.4	2.1
3. Disaster Response	7.9	1.8	8.3	1.8	8.1	1.7	8.2	1.8
4. Hazard Signs	8.0	1.6	8.2	1.8	7.8	1.8	8.1	1.7

Figure 1 illustrates satisfaction with maintenance response activities by the **six freeways** studied. Satisfaction with detours was low for each freeway (means ranged from 6.7 to 7.9) with Interstate 10 receiving the especially low rating of 6.7.

Figure 1: Satisfaction with Maintenance Response by Freeway

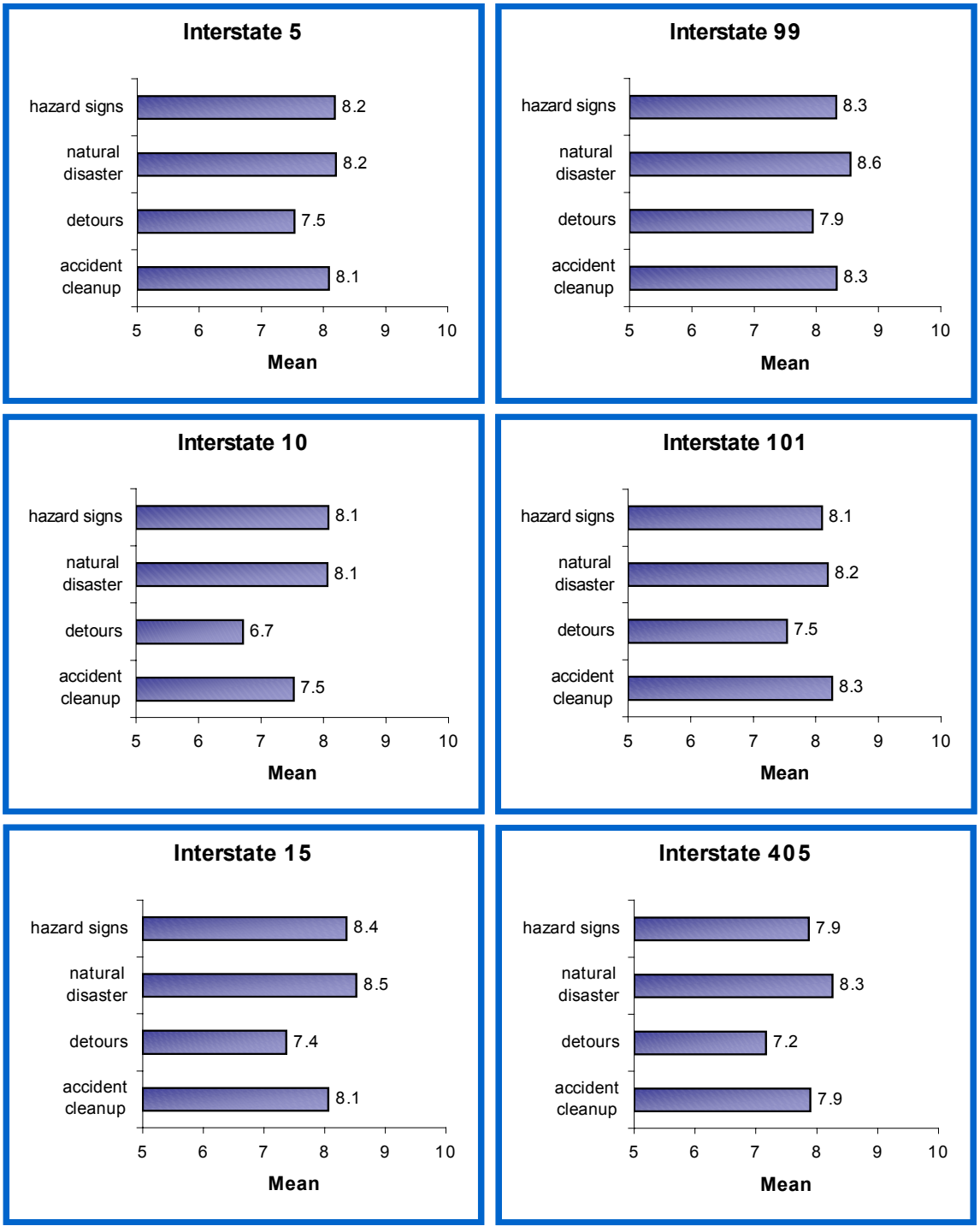
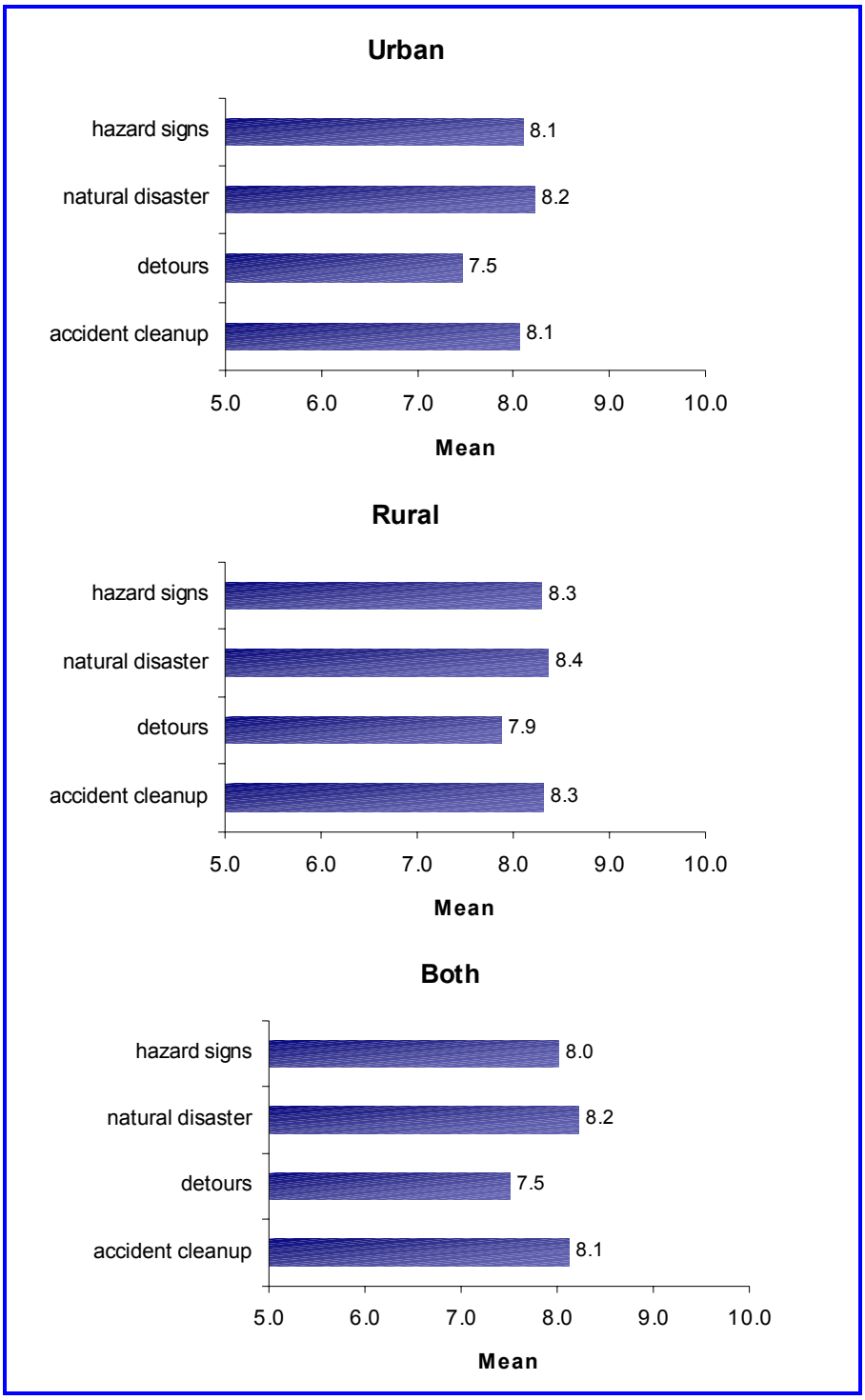


Figure 2 displays satisfaction with maintenance response activities by respondents in **urban versus rural** settings. The Figure reveals that respondents traveling in rural settings were slightly more satisfied than respondents traveling in urban settings in all maintenance subcategories; particularly detours (rural mean of 7.9; urban mean of 7.5)

Figure 2: Satisfaction with Maintenance Response by Urban/Rural



Satisfaction with Safety

Table 11 summarizes satisfaction with **safety activities by region**. As Table 11 shows, for ice and snow removal, chain controls, debris removal, safety barriers, and sign visibility the mean values are consistently quite high (means ranged from 7.6 to 8.5) for each of the eight regions. However, respondents are less satisfied with the maintenance of shoulders and turnouts (means ranged from 7.2 to 7.7). Respondents in the Bay Area and the San Joaquin Valley regions rated maintenance of shoulders and turnouts slightly lower than those in the other six regions (means of 7.2 and 7.3 respectively).

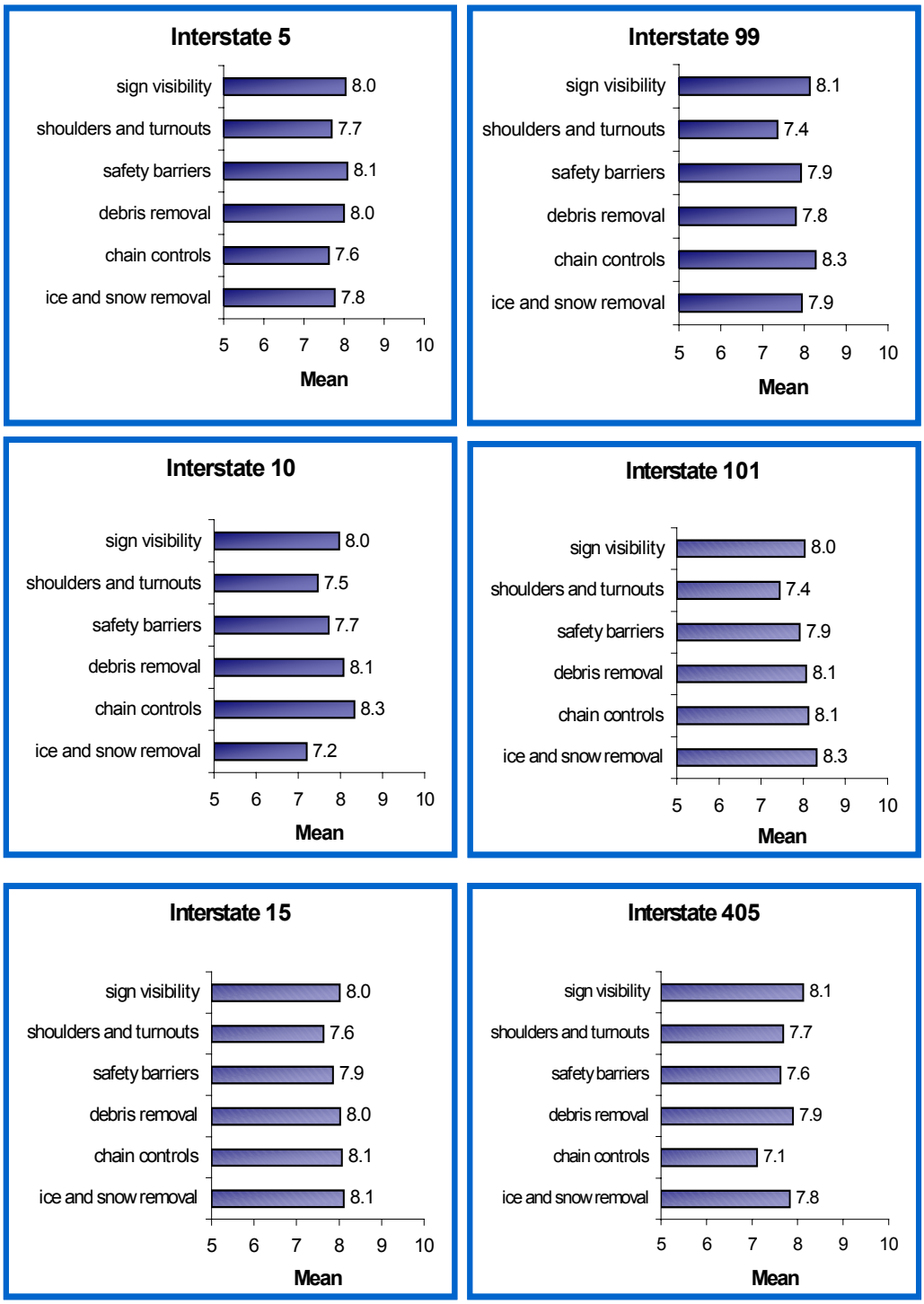
Table 11: Satisfaction with Safety by Region

Question	Eastern CA		North Valley		Sacramento		San Joaquin Valley	
	Mean	S.D.	Mean	S.D	Mean	S.D	Mean	S.D
1. Ice and Snow Removal	8.0	1.9	8.0	1.9	8.5	1.2	8.0	1.6
2. Chain Controls	7.8	2.2	8.4	1.9	7.7	2.2	8.2	2.2
3. Debris Removal	7.6	2.1	7.9	2.0	7.9	1.9	7.7	2.0
4. Safety Barriers	8.0	1.9	8.2	1.8	8.0	1.9	7.9	1.9
5. Maintenance of Shoulders and Turnouts	7.7	2.0	7.6	2.1	7.5	2.0	7.3	2.2
6. Sign Visibility	8.2	1.8	8.1	1.8	8.1	1.8	8.0	1.8

Question	Bay Area		Coast		LA Basin		San Diego	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1. Ice and Snow Removal	8.2	1.5	7.9	2.1	7.9	2.4	7.7	2.4
2. Chain Controls	7.9	1.8	7.8	2.5	7.9	2.7	7.8	2.5
3. Debris Removal	7.7	2.0	8.0	2.0	7.8	2.0	8.0	2.0
4. Safety Barriers	7.7	1.8	8.0	2.0	7.7	1.9	8.0	1.8
5. Maintenance of Shoulders and Turnouts	7.2	2.2	7.4	2.1	7.4	2.0	7.7	2.0
6. Sign Visibility	7.8	1.8	8.2	1.8	7.9	1.9	8.0	2.0

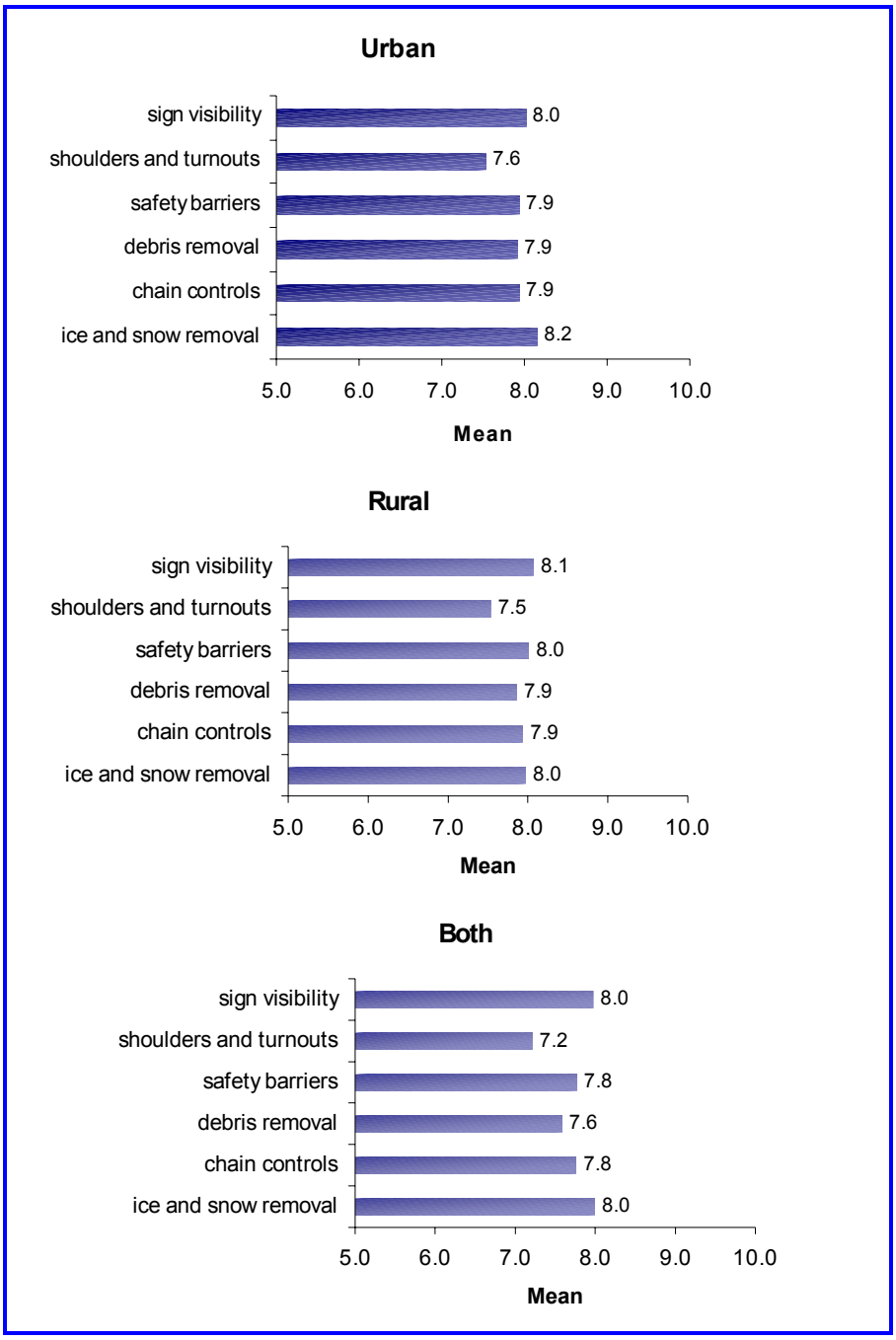
Figure 3 illustrates satisfaction with **safety activities by the six freeways** studied. Respondents of Interstates 5 and 405 were less satisfied with chain controls, with means of 7.6 and 7.1 respectively. Ice and snow removal was rated lower for Interstate 10 (7.2).

Figure 3: Satisfaction with Safety by Freeway



Satisfaction with safety activities by respondents traveling in **urban versus rural** settings is shown in Figure 4. For most activities, across all seven of the maintenance subcategories, respondents traveling in rural settings rated each maintenance activity slightly higher than respondents traveling in urban settings did. However, it is interesting to note in Figure 4 that rural respondents rate shoulders and turnouts (rural mean of 7.5, urban mean of 7.6) and ice and snow removal (rural mean of 8.0, urban mean of 8.2) activities very slightly lower than urban respondents do.

Figure 4: Satisfaction with Safety by Urban/Rural



Satisfaction with Pavement Conditions

Table 12 summarizes satisfaction with **pavement condition** activities by region. As Table 12 shows, for surface traction, marking visibility, removal of markings, pavement resurfacing, and approaches to bridges the mean values are similar for each of the eight regions, showing a high consensus among respondents' opinions. Satisfaction ratings for maintenance of smooth **road surfaces and potholes**, however, were consistently lower than the other four pavement condition ratings, and this result is true for all eight regions. The Bay Area gave the lowest rating for pothole repair (mean of 6.0), but the high standard deviations (2.3-2.6) for the seven other regions indicate there is a pronounced difference of opinion concerning this issue.

Table 12: Satisfaction with Pavement Conditions by Region

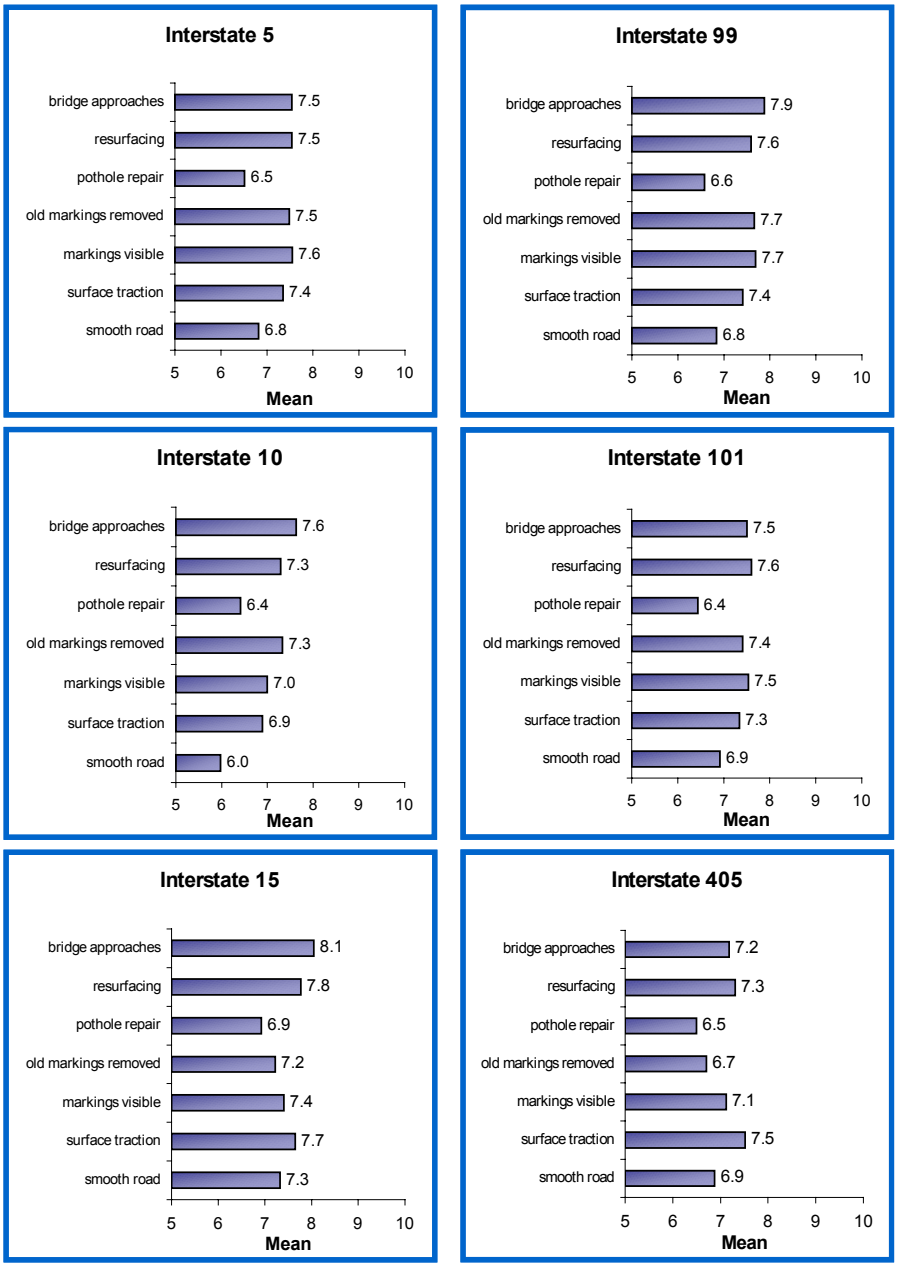
Question	Eastern CA		North Valley		Sacramento		San Joaquin Valley	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1. Smooth Road Surfaces	7.0	2.4	7.1	2.4	6.8	2.3	7.0	2.3
2. Surface Traction	7.5	2.1	7.7	1.9	7.4	1.8	7.5	1.9
3. Marking Visibility	7.5	2.0	7.6	2.1	7.5	1.9	7.6	2.1
4. Removal of Markings	7.8	1.9	7.9	2.0	7.6	2.0	7.4	2.1
5. Pothole Repair	6.7	2.5	7.0	2.3	6.6	2.4	6.4	2.5
6. Pavement Resurfacing	7.7	2.0	7.8	2.0	7.5	1.9	7.5	2.1
7. Approaches to Bridges	7.9	1.9	7.9	1.9	7.5	1.9	7.7	1.8

Table 12: Satisfaction with Pavement Conditions by Region (cont.)

Question	Bay Area		Coast		LA Basin		San Diego	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1. Smooth Road Surfaces	6.6	2.4	6.8	2.4	6.7	2.3	7.3	2.2
2. Surface Traction	7.2	2.1	7.3	2.0	7.1	2.0	7.6	2.0
3. Marking Visibility	7.1	2.1	7.7	2.0	7.1	2.0	7.5	2.0
4. Removal of Markings	6.9	2.2	7.6	2.1	7.1	2.1	7.3	2.2
5. Pothole Repair	6.0	2.4	6.4	2.6	6.4	2.4	6.9	2.4
6. Pavement Resurfacing	7.2	2.1	7.6	2.0	7.3	2.0	7.6	2.0
7. Approaches to Bridges	7.3	1.9	7.6	2.0	7.4	1.9	7.8	1.8

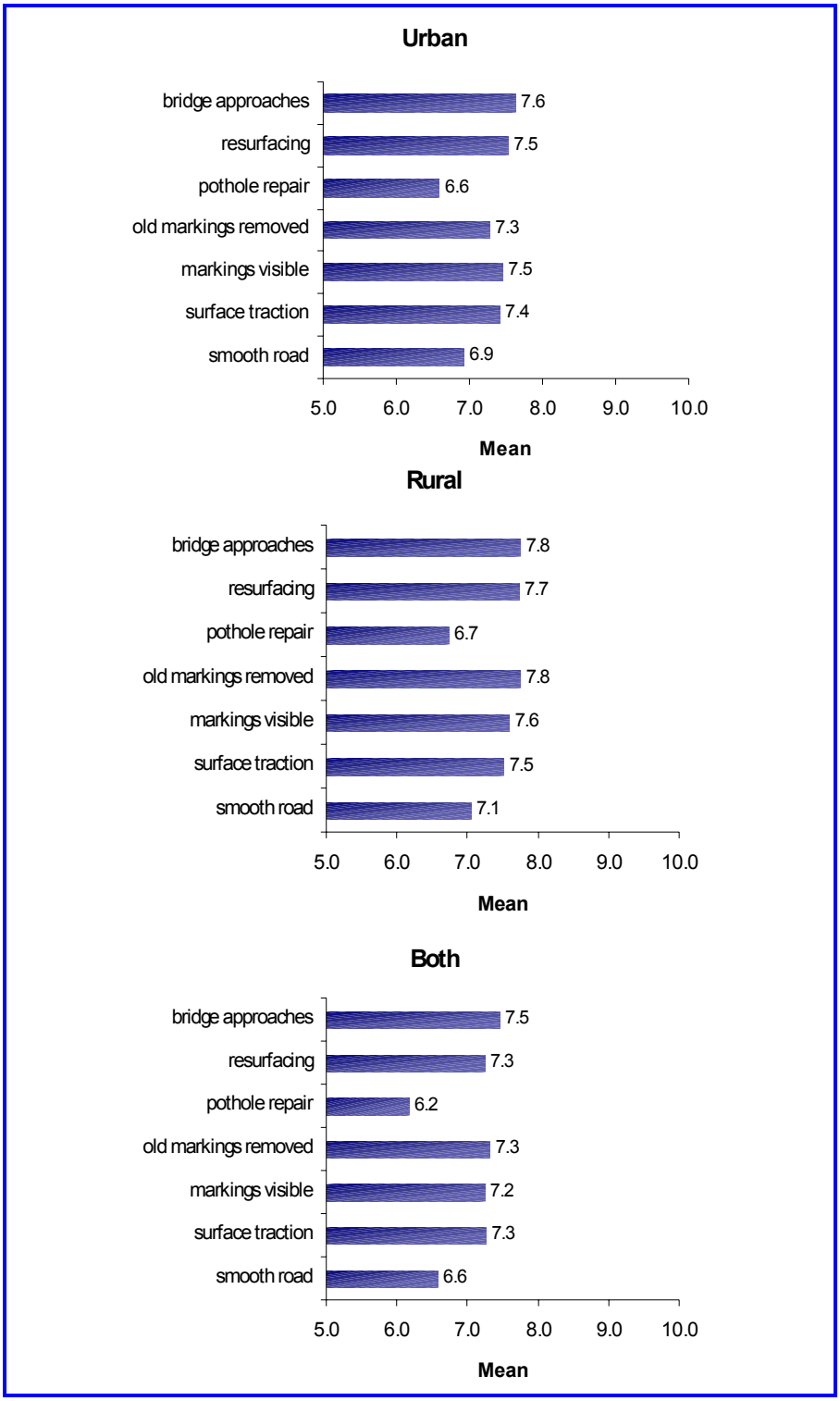
Figure 5 illustrates satisfaction with pavement condition activities by the six freeways studied. The Figure confirms that this lower satisfaction with smooth road surfaces and pothole repair was equally low for all six freeways; pothole repair satisfaction ranged from 6.4 to 6.9 and smooth road satisfaction ranged form 6.0 to 7.3. Also, Figure 5 illustrates that Interstates 10 and 405 ranked low overall in the seven pavement conditions surveyed.

Figure 5: Satisfaction with Pavement Conditions by Freeway



Satisfaction with pavement condition activities by urban versus rural settings is shown in Figure 6. In every subcategory, respondents traveling in rural settings report slightly higher satisfactions with pavement conditions.

Figure 6: Satisfaction with Pavement Conditions by Urban/Rural



Satisfaction with Traffic Flow

Table 13 summarizes satisfaction with traffic flow activities by region. As Table 13 shows, respondents in all regions gave lower satisfaction ratings to **maintenance delays** (means ranged from 6.1 to 7.2) than they did for **information about traffic conditions** (means ranged from 7.6 to 8.3) and **maintenance scheduling and timing** (means ranged from 6.9 to 7.6). Among the eight regions, respondents in the Bay Area and the Los Angeles Basin gave lower satisfaction ratings for maintenance delays, with means of 6.1 and 6.2 respectively.

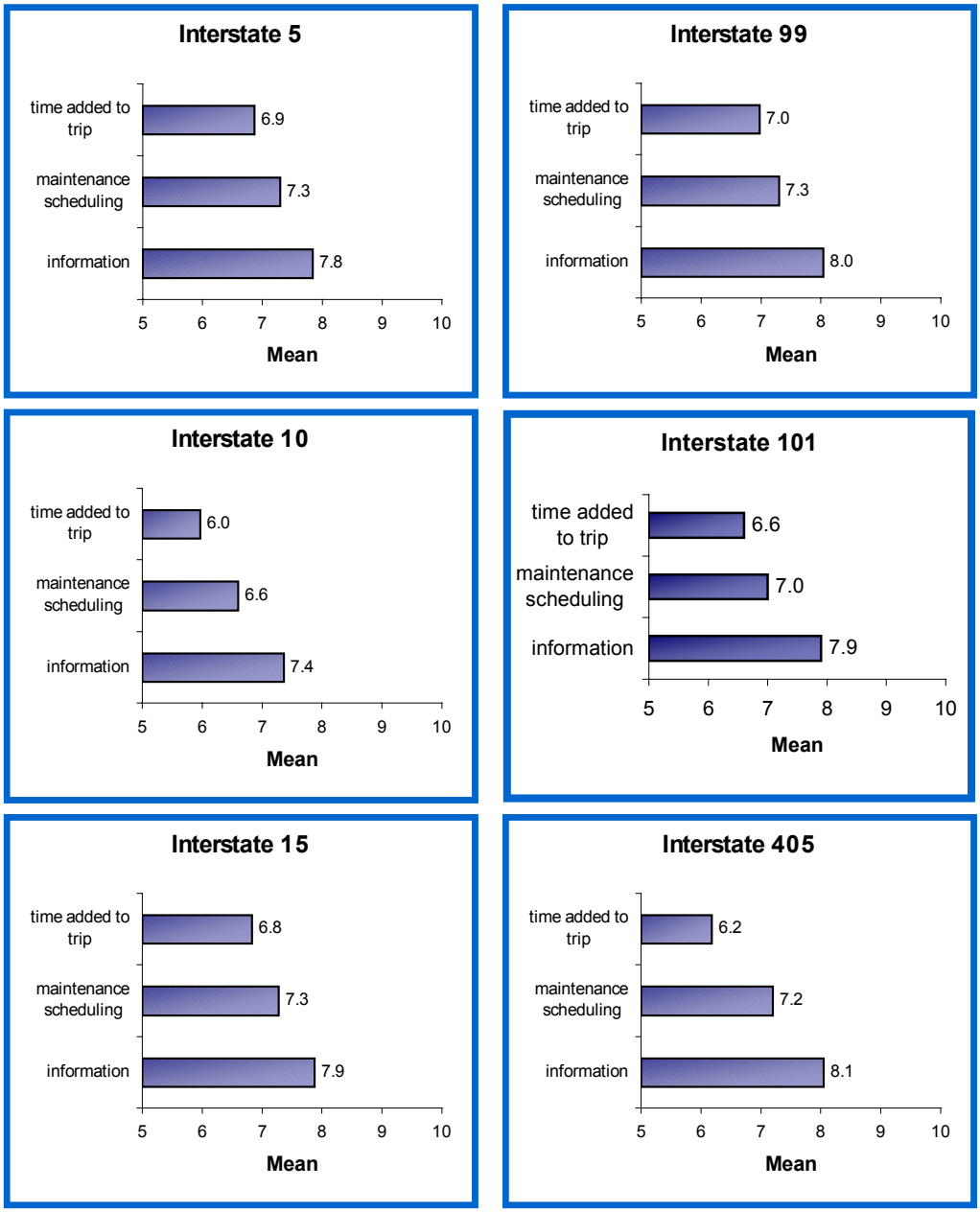
Table 13: Satisfaction with Traffic Flow by Region

Question	Eastern CA		North Valley		Sacramento		San Joaquin Valley	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1. Traffic Information	8.0	2.2	8.3	2.1	8.0	2.0	8.2	1.8
2. Maintenance Scheduling	7.2	2.3	7.6	2.2	7.2	2.1	7.1	2.2
3. Maintenance Delays	7.1	2.3	7.2	2.2	6.8	2.1	6.8	2.3

Question	Bay Area		Coast		LA Basin		San Diego	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1. Traffic Information	7.7	2.0	8.1	2.0	7.6	2.2	7.7	2.2
2. Maintenance Scheduling	6.9	2.1	6.9	2.3	6.9	2.2	7.5	2.1
3. Maintenance Delays	6.1	2.2	6.9	2.2	6.2	2.3	6.9	2.2

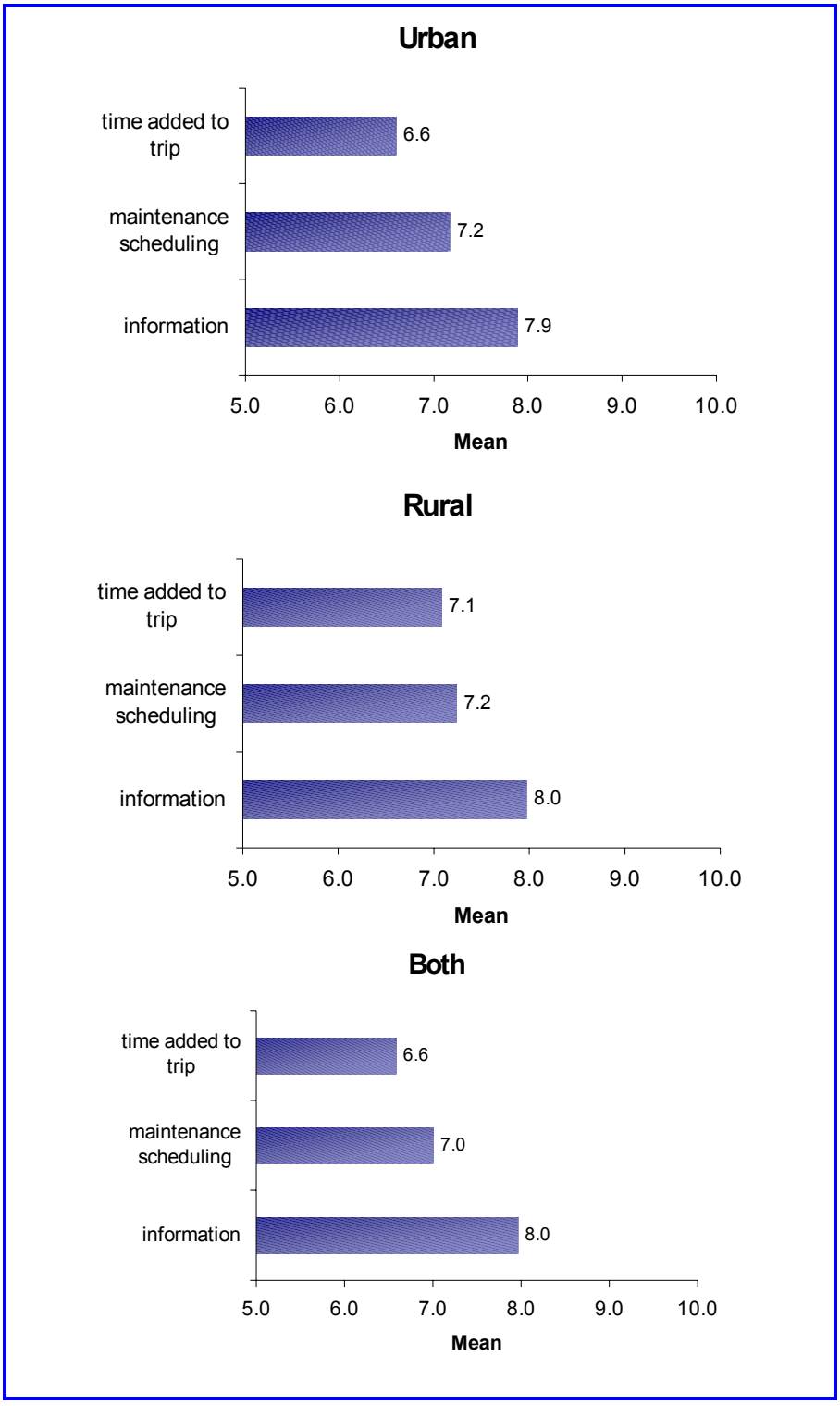
Figure 7 illustrates satisfaction with **traffic flow activities** by the six freeways studied. Interstates 10 and 405 present lower time added to trip ratings; 6.0 and 6.2 respectively. Further, Interstate 10 ranked notably lower in the maintenance scheduling and information subcategories. In the maintenance scheduling subcategory Interstate 10 was rated 6.6 while the remaining five freeways were rated between 7.0 and 7.3. Similarly, in the information subcategory Interstate 10 was rated 7.4 while the remaining five freeways were rated between 7.8 and 8.1.

Figure 7: Satisfaction with Traffic Flow by Freeway



Satisfaction with traffic flow activities by urban versus rural settings is shown in Figure 8. Respondents traveling in urban locations reported lower satisfaction in the time added to trip subcategory; with an urban mean of 6.6 compared to a rural mean of 7.1.

Figure 8: Satisfaction with Traffic Flow by Urban/Rural



Satisfaction with Travel Amenities

Table 14 summarizes satisfaction with travel amenities by region. As Table 14 shows, respondents in all regions gave lower satisfaction ratings to **rest room maintenance** (means ranged from 6.9 to 7.7) than they did for **rest area grounds** (means ranged form 7.6 to 8.4) and rest area safety (means ranged from 7.4 to 8.1). Among the eight regions, respondents in the Bay Area and the Los Angeles Basin gave lower satisfaction ratings for rest room maintenance, 6.9 and 7.1 respectively.

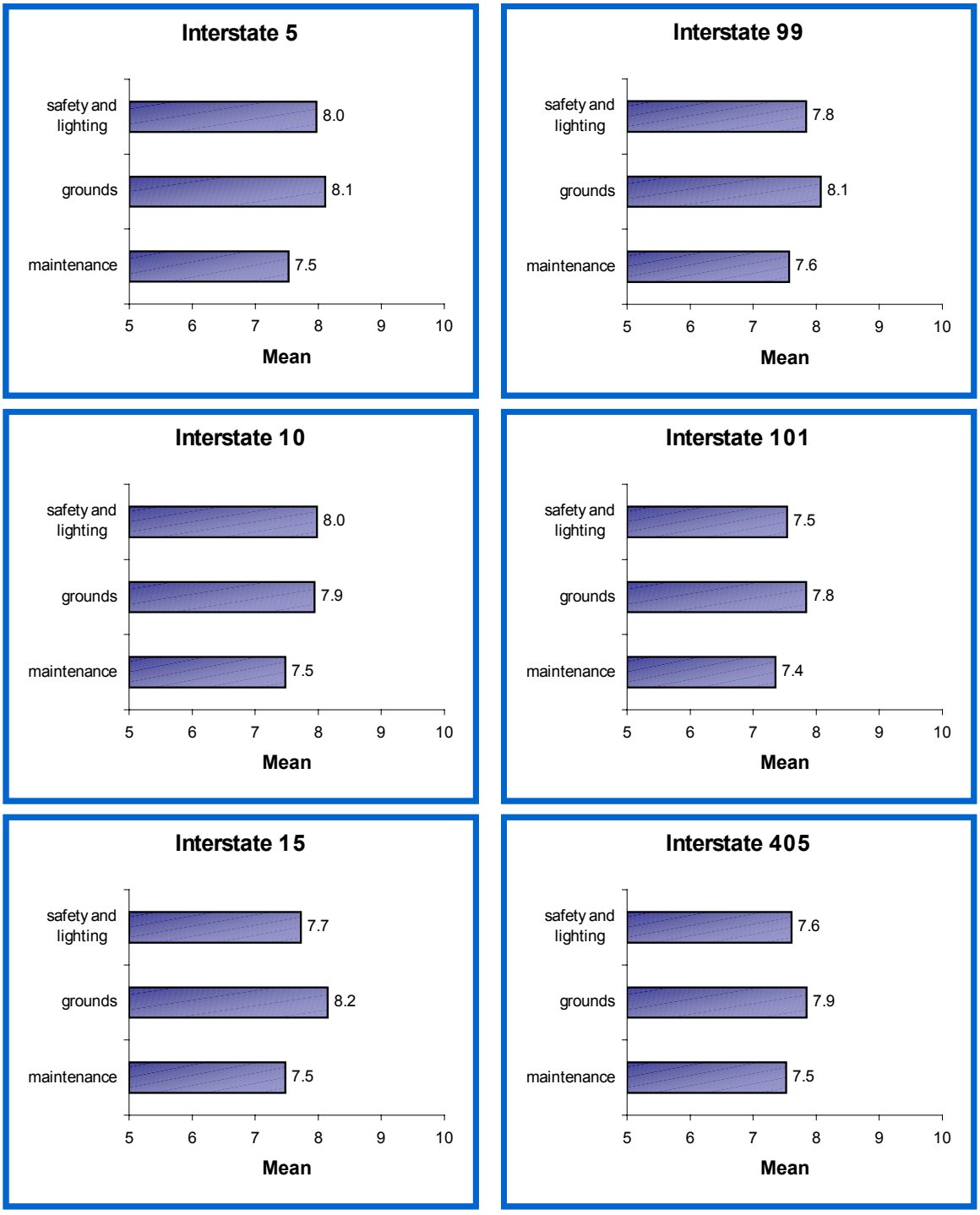
Table 14: Satisfaction with Travel Amenities by Region

Question	Eastern CA		North Valley		Sacramento		San Joaquin Valley	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1. Rest Room Maintenance	7.6	2.0	7.7	1.9	7.4	2.0	7.4	2.1
2. Rest Area Grounds	8.2	1.6	8.4	1.5	8.0	1.7	7.9	1.7
3. Rest Area Safety	8.0	1.7	8.1	1.7	7.8	1.7	7.6	2.0

Question	Bay Area		Coast		LA Basin		San Diego	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1. Rest Room Maintenance	6.9	2.3	7.4	2.1	7.1	2.2	7.3	2.2
2. Rest Area Grounds	7.6	1.9	8.0	1.8	7.6	1.8	7.8	1.9
3. Rest Area Safety	7.4	2.0	7.8	1.9	7.5	1.9	7.6	1.9

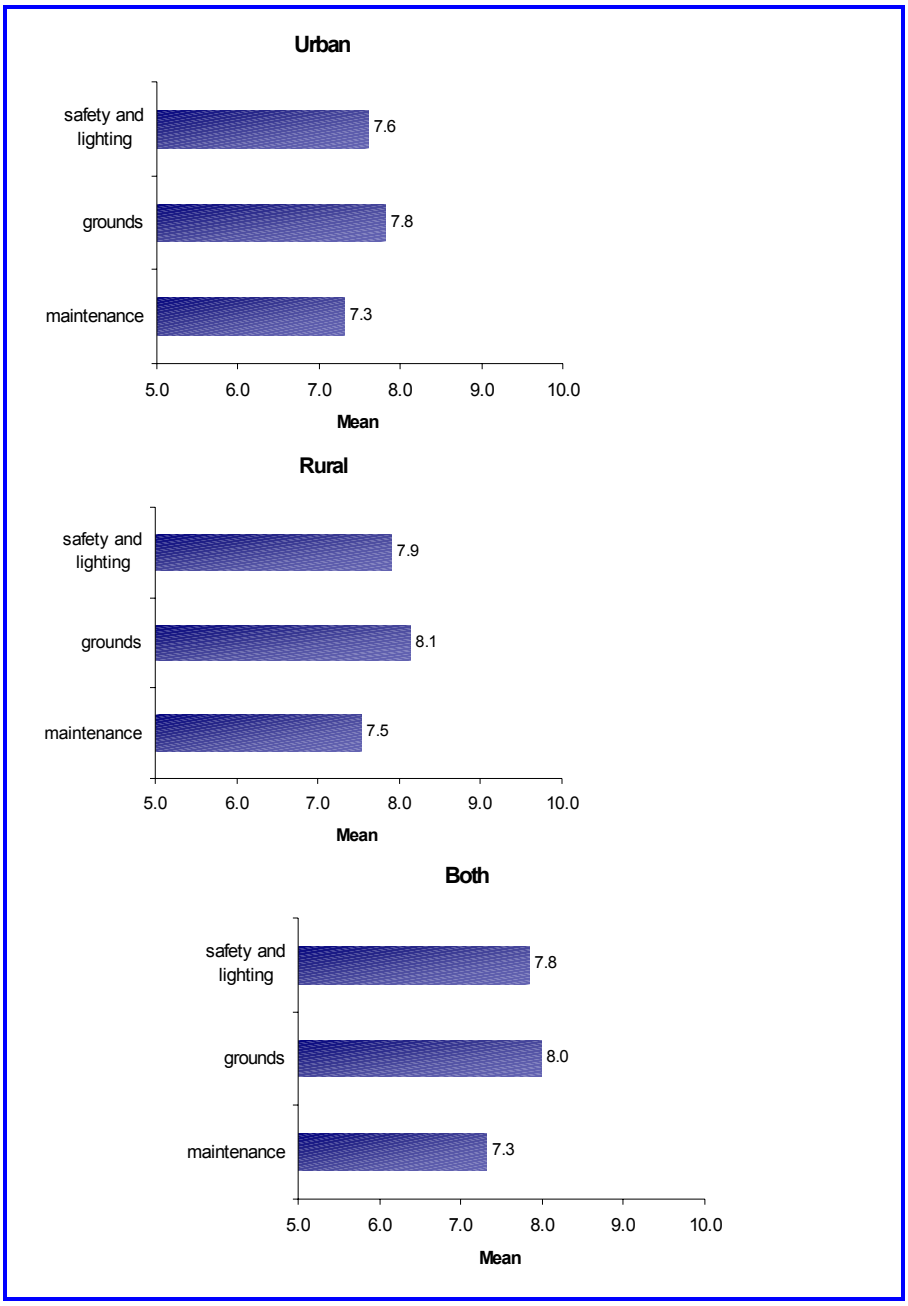
Figure 9 illustrates satisfaction with travel amenities activities by the six freeways studied. Results were similar for all **six freeways** studied. Means ranged from 7.4 to 7.6 for maintenance, 7.8 to 8.2 for grounds, and 7.5 to 8.0 for safety and lighting.

Figure 9: Satisfaction with Travel Amenities by Freeway



Satisfaction with travel amenities activities by **urban versus rural** settings is shown in Figure 10. As observed in previous categories, rural respondents reported slightly higher satisfaction within each activity of the travel amenities category. However, satisfaction with maintenance was slightly lower than the remaining travel amenities subcategories for urban and rural respondents; 7.3 and 7.5 respectively.

Figure 10: Satisfaction with Travel Amenities by Urban/Rural



Satisfaction with Visual Appeal

Table 15 summarizes satisfaction with visual appeal activities by region. Overall, respondents rated the activities in the visual appeal category lower than the other six maintenance categories. As Table 15 shows, for landscape maintenance, weed control, litter removal, and graffiti removal the mean respondents' rating for each of the regions was quite different. Respondents in the Sacramento and San Joaquin Valley regions gave lower satisfaction ratings for **weed removal** (6.9 and 6.7 respectively) than the other six regions (the remaining six regions' means ranged from 7.0 to 7.6). Respondents in the San Joaquin Valley and the Bay Area regions gave lower satisfaction ratings for **litter removal** (6.9 and 6.6 respectively) than the other six regions (the remaining six regions' means ranged from 7.1 to 7.6). Respondents in the Bay Area and the Los Angeles Basin regions gave lower evaluations for **graffiti removal** (7.2 and 7.0 respectively) than the other six regions (the remaining six regions' means ranged from 7.4 to 7.9)

Table 15: Satisfaction with Visual Appeal by Region

Question	Eastern CA		North Valley		Sacramento		San Joaquin Valley	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1. Landscape Maintenance	7.6	2.2	7.8	2.1	7.1	2.1	6.9	2.4
2. Weed Control	7.3	2.3	7.6	2.2	6.9	2.2	6.7	2.5
3. Litter Removal	7.4	2.2	7.6	2.1	7.1	2.2	6.9	2.3
4. Graffiti Removal	7.8	2.2	7.9	2.1	7.6	2.1	7.4	2.2

Question	Bay Area		Coast		LA Basin		San Diego	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1. Landscape Maintenance	7.1	2.1	7.5	2.2	7.2	2.1	7.7	2.1
2. Weed Control	7.0	2.2	7.2	2.3	7.1	2.0	7.6	2.1
3. Litter Removal	6.6	2.3	7.4	2.1	7.1	2.0	7.4	2.1
4. Graffiti Removal	7.2	2.2	7.6	2.2	7.0	2.4	7.5	2.1

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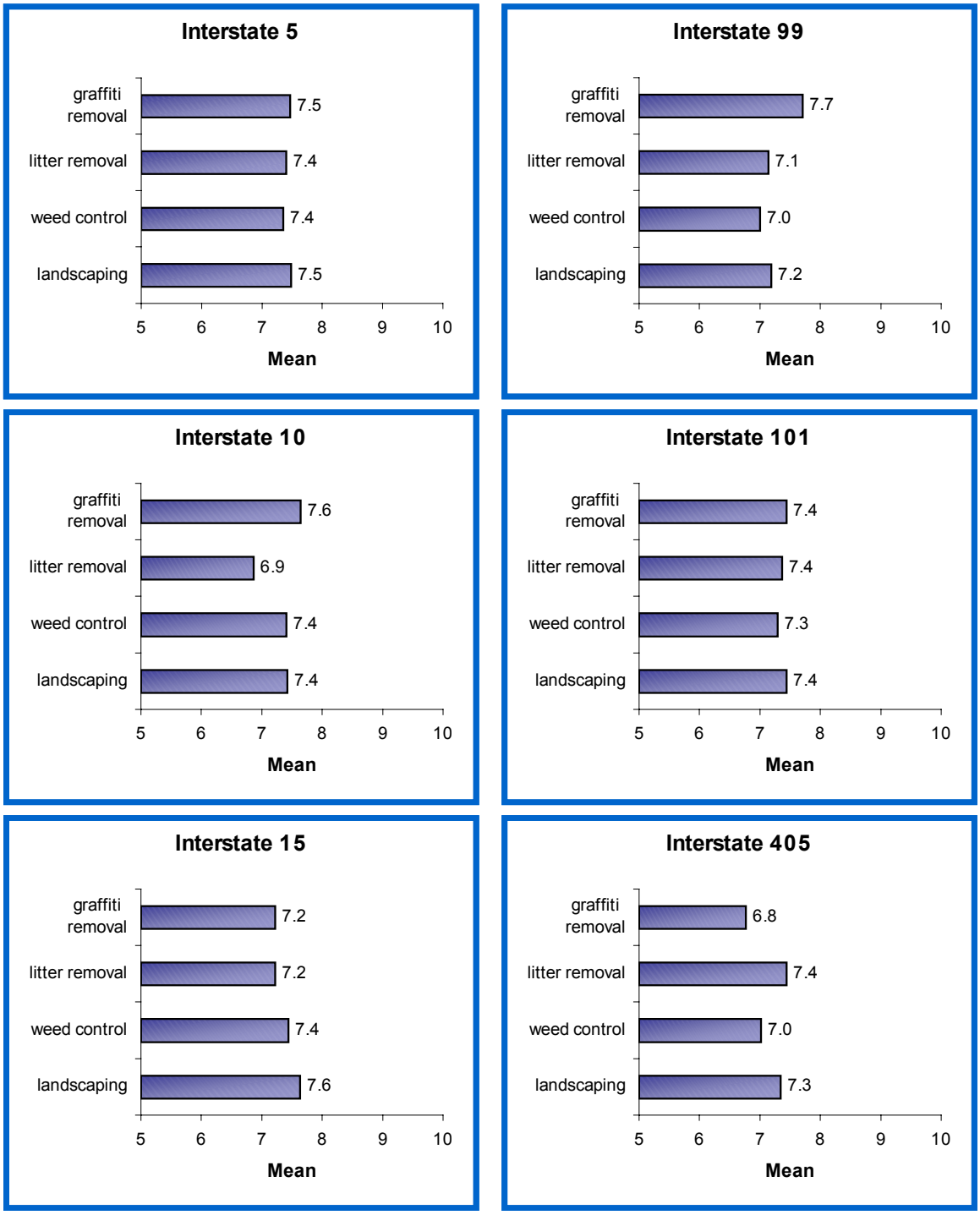
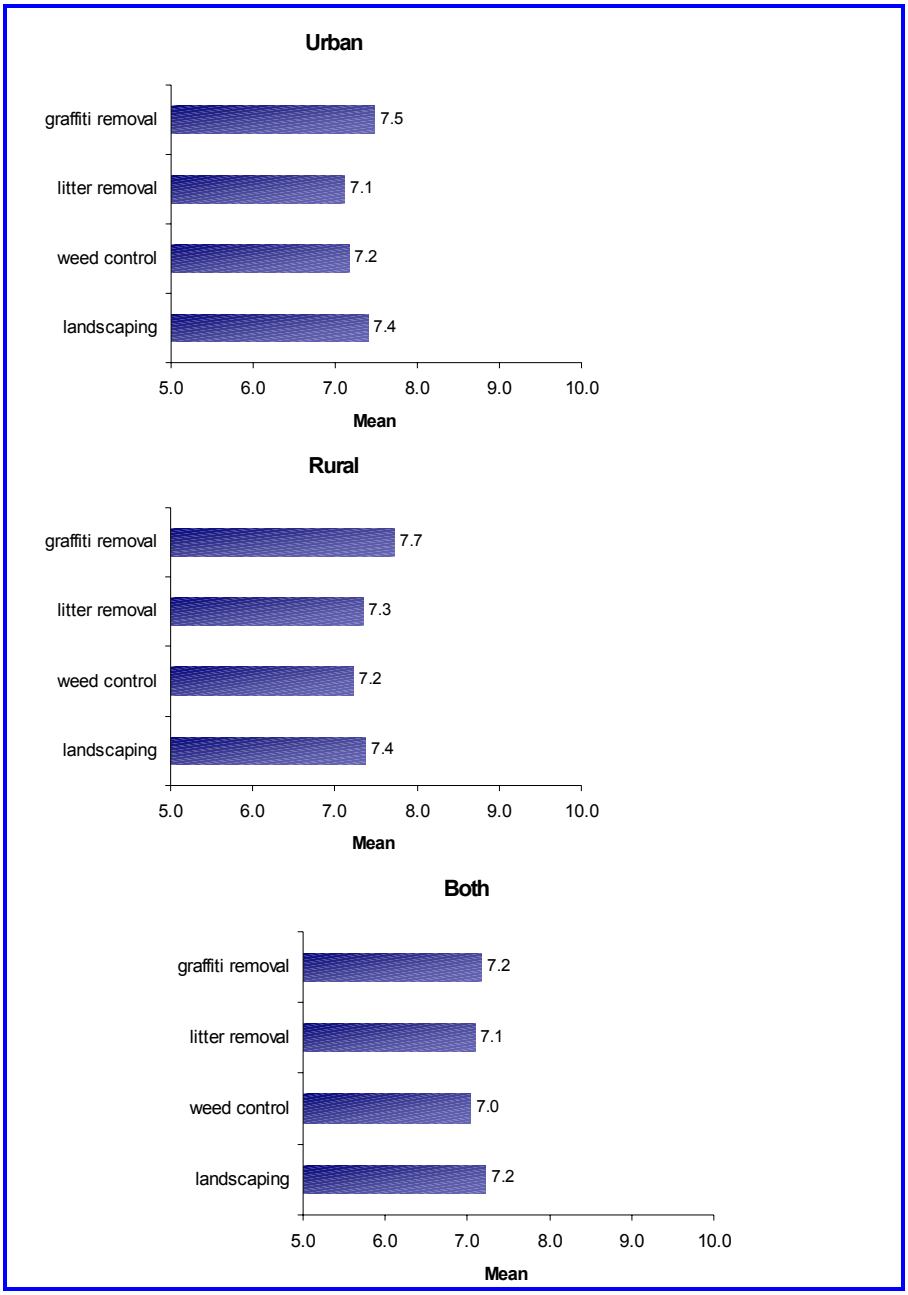
Figure 11 illustrates satisfaction with visual appeal activities by the **six freeways** studied. Interstate 10 ranked notably lower in the litter subcategory; 6.9 compared to a range of 7.1 to 7.4 for the five remaining regions. Similarly, in the graffiti subcategory Interstate 405 was rated 6.8 while the remaining five freeways were rated between 7.2 and 7.7.

Figure 11: Satisfaction with Visual Appeal by Freeway



Satisfaction with visual appeal activities by **urban versus rural** settings is shown in Figure 12. Respondents traveling in urban settings reported slightly lower satisfaction in the litter removal and graffiti removal subcategories. Urban and rural respondents gave equivalent ratings for landscaping and weed control.

Figure 12. Satisfaction with Visual Appeal by Urban/Rural



Satisfaction with Trip Quality and Overall Satisfaction

Table 16 summarizes satisfaction trip quality and overall satisfaction by region. Trip quality and overall satisfaction ratings are remarkably consistent for each of the six regions with a mean range of 7.4 to 7.9 for **trip quality** and a mean range of 7.4 to 8.0 for **overall satisfaction**. As observed in other maintenance categories, respondents in the Bay Area gave the lowest satisfaction rating for both the trip quality and overall satisfaction (7.4 in both cases).

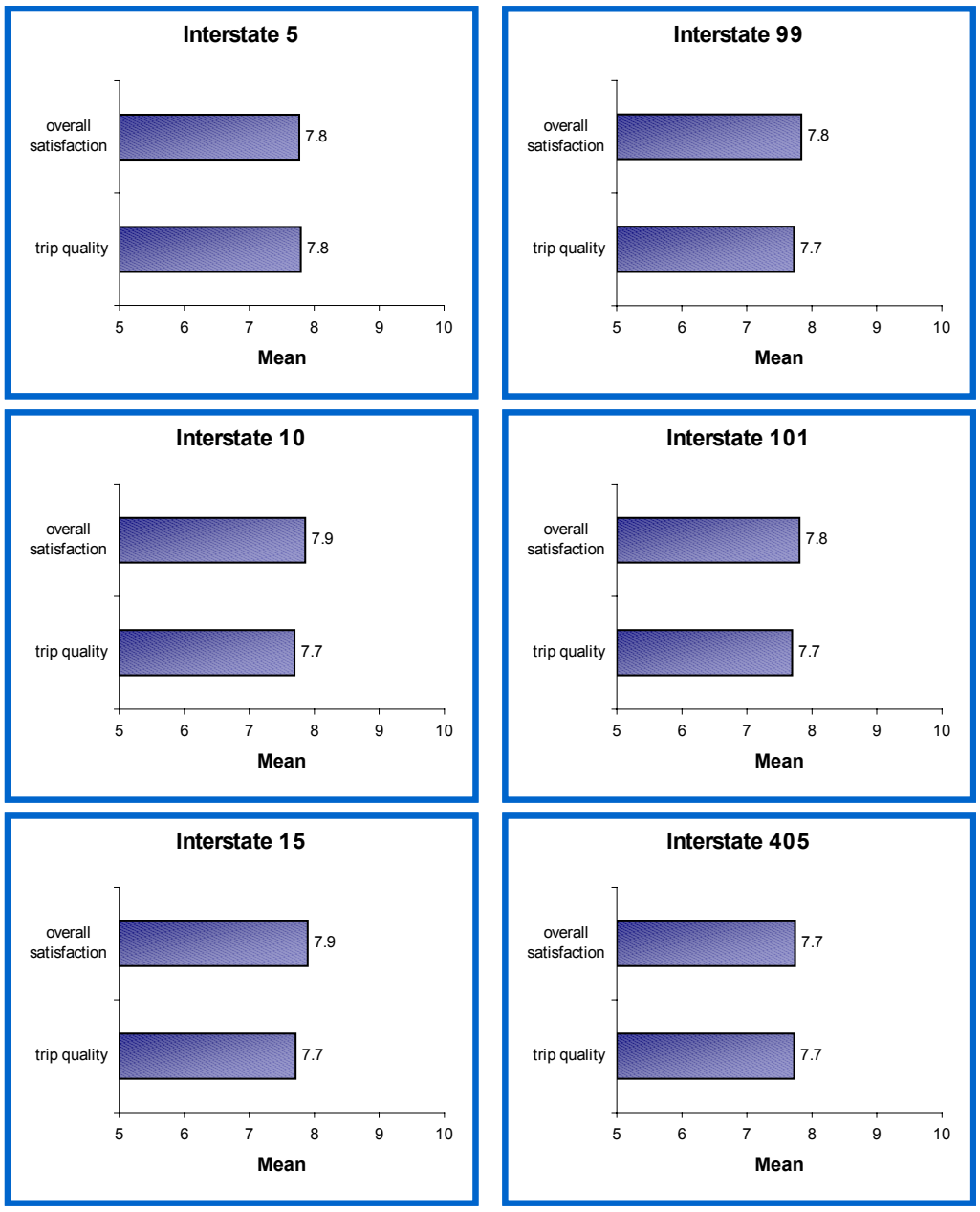
Table 16: Satisfaction with Trip Quality and Overall Satisfaction

Question	Eastern CA		North Valley		Sacramento		San Joaquin Valley	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1. Trip Quality	7.9	1.6	7.9	1.6	7.7	1.4	7.6	1.6
2. Overall Rating	7.9	1.8	8.0	1.6	7.7	1.6	7.9	1.7

Question	Bay Area		Coast		LA Basin		San Diego	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1. Trip Quality	7.4	1.6	7.8	1.6	7.6	1.5	7.8	1.4
2. Overall Rating	7.4	1.7	7.9	1.5	7.6	1.7	7.9	1.6

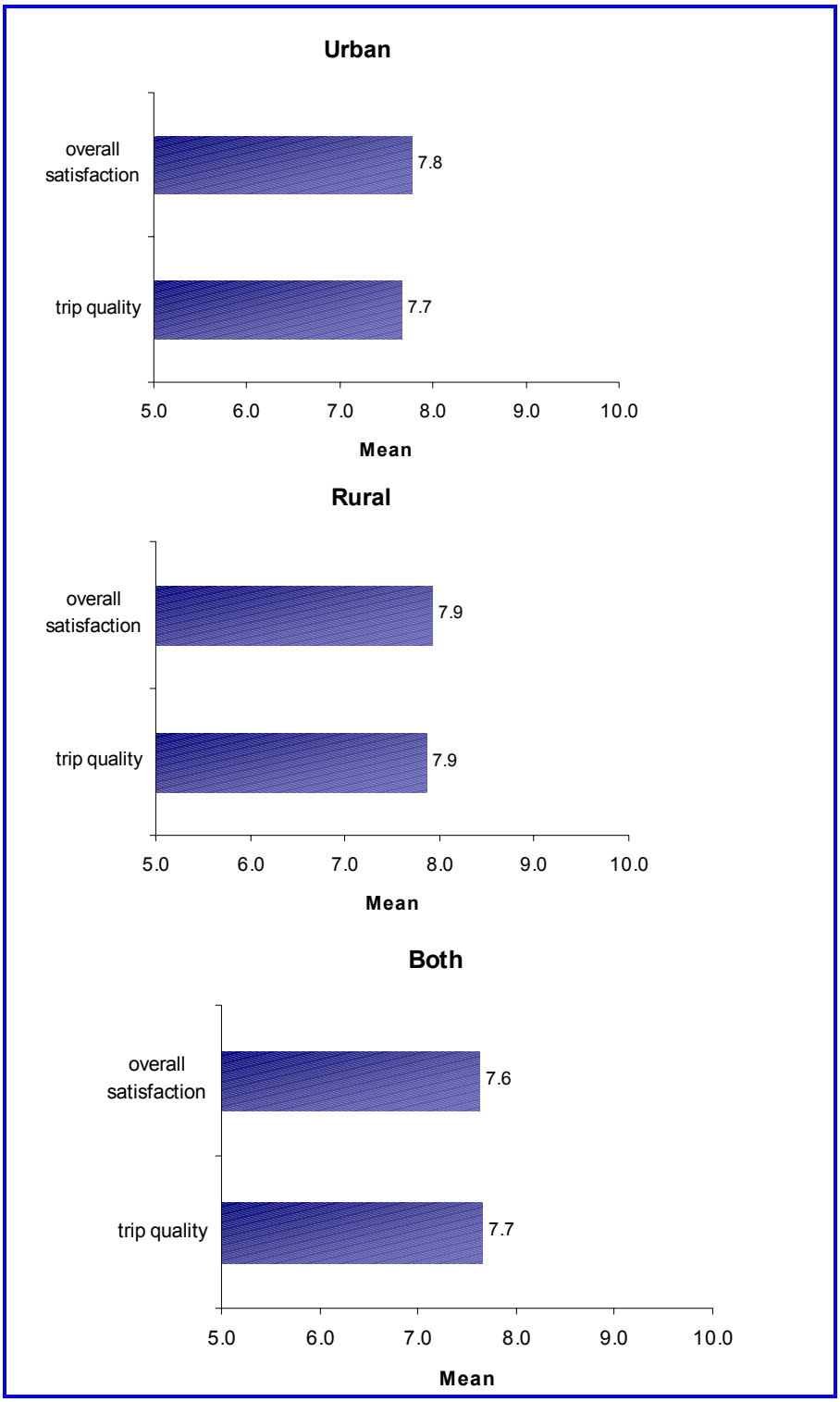
Figure 13 illustrates satisfaction with trip quality and overall satisfaction by the **six freeways studied**. The mean ratings were remarkably consistent across all six freeways with a range of 7.7 to 7.8 for trip quality and a range of 7.7 to 7.9 for overall satisfaction. Respondents' overall satisfaction rating of Interstate 10 is surprisingly high (7.9) considering several of the other relatively low ratings given to the freeway in several other maintenance categories; particularly pavement conditions (Interstate 10 category mean of 6.9) and traffic flow (Interstate 10 category mean of 6.7). Subsequent factor and regression analyses should help clarify this issue.

Figure 13: Satisfaction with Trip Quality and Overall Satisfaction by Freeway



Satisfaction with trip quality and overall satisfaction by **urban versus rural** settings is shown in Figure 14. As observed in previous categories, rural respondents reported slightly higher satisfaction within each activity of the trip quality and overall satisfaction category.

Figure 14: Satisfaction with Trip Quality and Overall Satisfaction by Urban/Rural



Conclusions

During the weeks of August 12, 2001, and November 1, 2001, a survey of California drivers was designed and administered by the Applied Research Center at California State University, Bakersfield. The purpose of this survey was to assess drivers' attitudes toward the services provided by the California Department of Transportation. While the sample covered the entire state of California, there were not enough cases to process statistics and comparisons for all of the state's freeways. The freeways included in this study were Interstates 5, 10, 15, 99, 101, and 405.

California drivers who responded to the survey were asked to rate their satisfaction within each of seven categories of maintenance-related questions. Each respondent rated satisfaction on a scale from one to ten with one indicating extreme dissatisfaction and ten indicating extreme satisfaction. Overall, respondents gave mid to high satisfaction ratings in all seven of the maintenance categories surveyed with means of 7 to 8.

Comparative analyses of these means were performed by: (1) respondent's region of the state, (2) respondent's most frequently traveled freeway, and (3) respondent's most frequently traveled setting: urban or rural.

Analyses by Region of the State

Analyses by respondent's region of the state reveal less satisfaction with highway maintenance activities in the Bay Area and Los Angeles Basin. In the "maintenance response" category, respondents in the Bay Area and Los Angeles Basin were less satisfied with "**detours around accidents** or closures" than respondents in the other six regions. In the "safety" category Bay Area and San Joaquin Valley respondents rated "**maintenance of shoulders and turnouts**" lower than respondents in the other six regions.

Respondents in all eight regions were less satisfied with "**smooth road surfaces**" and "**pothole repair**" than the other four subcategories in the "pavement conditions" category. Bay Area respondents gave the lowest rating for "pothole repair."

In the "traffic flow" category respondents in all regions gave lower satisfaction ratings to "**timing and scheduling of maintenance activities**." Respondents in the Bay Area and the Los Angeles Basin gave the lower satisfaction ratings for "**the amount of time added to a trip due to maintenance delays."**

In the "travel amenities" category respondents in all eight regions gave lower satisfaction ratings to "**rest room maintenance at rest areas**" with the Bay Area and the Los Angeles Basin ranking the lowest.

Overall, respondents rated the activities in the "**visual appeal**" category lower than the other six maintenance categories. Respondents in the Sacramento and San Joaquin Valley regions gave lower satisfaction ratings for "**weed control**." Respondents in the San Joaquin Valley and the

Bay Area regions gave lower satisfaction ratings for "**litter removal**." In the Bay Area and the Los Angeles Basin regions respondents gave lower ratings for "**graffiti removal**."

Finally, in the "trip quality and overall satisfaction" category ratings are remarkably consistent for each of the six regions with a mean range of 7.4 to 7.9 for "**trip quality**" and a mean range of 7.4 to 8.0 for "**overall satisfaction**." As observed in other maintenance categories, respondents in the Bay Area gave the lowest satisfaction rating for both the "trip quality" and "overall satisfaction."

Analyses by Freeway

Analyses by respondent's most frequently traveled freeway reveal less satisfaction with highway maintenance activities on **Interstates 10 and 405**. In the "maintenance response" category, satisfaction with "detours around accidents and closures" was low for each freeway but was especially low for Interstate 10. In the "safety" category, respondents rated Interstates 5 and 405 low for "chain controls" while Interstate 10 was rated low for "ice and snow removal." All six freeways were rated low for "**smooth road surfaces**" and "**pothole repair**" in the "pavement conditions" category. Interstates 10 and 405 ranked low overall in each of the seven pavement conditions surveyed.

For the "traffic flow" category, Interstates 10 and 405 were ranked low for "the amount of time added to a trip due to maintenance delays." Further, **Interstate 10** ranked notably lower in the "timing and scheduling of maintenance activities" and "information provided on traffic conditions and delays." In the "travel amenities" category Interstate 10 ranked notably lower in "**litter removal**." Similarly, Interstate 405 was rated low for "**graffiti removal**."

Finally, in the "trip quality" and "overall satisfaction" category the mean ratings were remarkably consistent across all six freeways with a range of 7.7 to 7.8 for "**trip quality**" and a range of 7.7 to 7.9 for "overall satisfaction." Respondents' "**overall satisfaction**" rating of Interstate 10 is surprisingly high (7.9) considering the relatively low ratings given to the freeway in several other maintenance categories; particularly pavement conditions and traffic flow.

Analyses by Urban/Rural Setting

For most maintenance activities, across all seven of the surveyed categories, respondents in rural settings rated each activity slightly higher than respondents in urban settings. Generally, this pattern remains for the seven safety subcategories. However, it is interesting to note the only two subcategories (of the 29 surveyed) in which rural respondents rated an activity very slightly lower than urban respondents; those activities are "**maintenance of shoulders and turnouts**" and "**ice and snow removal.**"